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Surgical Shock.—Yandell Henderson associates the syndrome, shock, to collapse of the venous system and subsequent failure of circulation because of the deficient volume of blood returning to the heart through the veins. It was felt that if contractions in voluntary muscles could be sufficiently stimulated, the venous pressure might thereby be elevated and sufficient blood returned to the right heart to restore its function. This might be done by the use of such drugs as strychnine or curare, but it was thought that a safer method would be electrical stimulation of the muscles by the Faradic current. The apparatus used consisted of an electrical system which provided either alternating or direct current. Toweling was soaked in physiological saline and wrapped around the lower abdomen and corresponding portion of the lower lumbar and gluteal muscles of the patient in six layers to allow for universal contact and the adequate retention of moisture. Each lower extremity was similarly wrapped and large tin electrodes were applied both to the body and legs with precaution that no metal touched the skin. This provided satisfactory contractions of the muscle groups. In 38 normal young adults Faradic stimulation of the voluntary muscles to contract produced an elevation in the venous pressure of from 1.4 cm. of water to 10 cm. of water. A similar elevation of a physiologically very low venous pressure was obtained by this method in patients under the influence of spinal anaesthesia. In one patient suffering traumatic shock a very marked elevation of a previously very low venous pressure was obtained by the Faradic stimulation of the voluntary muscles. —*A Method of Raising Venous Pressure to Be Used in Surgical and Traumatic Shock (Preliminary Report), G. G. Ornstein, S. Licht & M. Herman, Quart. Bull. Sea View Hosp., April, 1939, iv, 333.*—(*A. A. E.*)

Partial Thoracoplasty and Pneumothorax.—Partial elastic anterolateral thoracoplasty on one side and pneumothrax on the other is possible only in some cases of concurrent tuberculous bilateral pulmonary lesions, especially those where the lesions are limited to the upper lobes. In such cases one may obtain a functional equilibrium similar to that of a concurrent bilateral pneumothorax. It is advisable in most cases to establish first a hypotensive pneumothorax on the least involved side, if an effective space can be found, and then to proceed with the thoracoplasty on the contralateral side, as soon as a satisfactory compression has been obtained. If intrapleural pneumonolysis is needed, this operation should be done only after thoracoplasty has been completed. This type of partial thoracoplasty in the contralateral lung is also indicated, when a threatening spread occurs in it, during effective pneumothorax treatment of one lung. If soon after a thoracoplasty a spread occurs in the contralateral lung, pneumothorax may be induced, but this requires a singular technical

dexterity; seldom we can expect lasting results from this contralateral pneumothorax. When a massive and febrile pleural effusion occurs on the contralateral side of a recent thoracoplasty, it may be necessary to replace fluid with air, and then continue the pneumothorax as long as necessary. When pneumothorax had been discontinued because of healing having occurred, this type of thoracoplasty is more promising of good results. In 20 cases reported in this paper results were so satisfactory that they could be compared favorably with results obtained in unilateral interventions. The thoracoplasty technique in these cases does not differ sensibly from the usual operation, provided that the formerly collapsed lung has regained full function and that mediastinal equilibrium is not markedly compromised. But the induction of a pneumothorax on the contralateral side of a partial elastic anterolateral thoracoplasty, that has healed the lung, is a more difficult problem. The management of such subsequent late pneumothorax must be particularly concerned with maintaining the functional equilibrium by avoiding excessive and too sudden retraction of the lung. Creation of abnormal repercussion on the mediastinum should also be avoided. Intrapleural pressures must be low and there should be just enough compression to control the lesions, if lasting success is desired.—*Trattamento di lesioni polmonari bilaterali con toracoplastica antero-laterale elastica e pneumotorace, P. Guglielmetti, Ann. Istituto Carlo Forlanini, November–December, 1938, ii, 862.*—(*S. L.*)

Delay of Periosteal Regeneration after Thoracoplasty.—Dissatisfaction with the results of formalin application in delaying costal regeneration led the authors to study the effects of an alcohol-ether solution of tannin. Use of a 20 per cent solution prevented regeneration in dogs for about three months, without untoward reactions. Application of this method in a series of thoracoplasties on 18 tuberculous patients retarded regeneration from six to ten weeks. The resulting pulmonary collapse was more gradual, but eventually more profound, requiring less extensive rib resection. The longer intervals possible between stages of thoracoplasty permitted the surgeon greater flexibility in selecting the optimum time for operation. The authors consider these preliminary results encouraging and advocate wider trial of the method.—*Étude sur l'emploi du tannin pour retarder la régénération périostée costale dans les thoracoplasties au cours de la tuberculoise pulmonaire, E. Leurat, E. Loubat & J. Magendie, Rev. de la tuberc., February, 1939, v, 170.*—(*H. L. I.*)

Thoracoplasty Technique.—The different thoracoplasty techniques used on 154 cases during 1931–1936 are described and discussed. In the later years the operation was performed in one stage in contrast to two stages formerly used.—*Einige Erfahrungen mit der Entwicklung der Thorakoplastiktechnik, S. Lundberg, Acta tuberc. Scandinav., Fasc. 4, 1938, xii, 336.*—(*F. B. S.*)

Thoracoplasty Revisions.—The indications for revision of a thoracoplasty have been persistently positive sputum with an uninvolved contralateral lung or persistently positive sputum with contralateral pulmonary involvement controlled by pneumothorax or thoracoplasty. The persistently positive sputum suggests residual cavitation beneath the thoracoplasty. Locating the residual cavity is done with difficulty by use of the Potter-Bucky roentgen technique or serial roentgenograms. In this paper there are presented the results of 43 revision operations on 39 patients. At least one year has elapsed since the last operation on each patient. Of the 39 patients operated upon, 15 subsequently showed conversion of sputum from positive to negative (38.6 per cent). In 14 patients (35.9 per cent) the sputum remained positive, and 10 patients (25.6 per cent) died.—*Results of Revision Operations, L. R. Davidson, M. Weinstein & A. E. Bloomberg, Quart. Bull. Sea View Hosp., April, 1939, iv, 295.*—(*A. A. E.*)

Intrapleural Pneumonolysis.—It is true that hypertensive pneumothorax may be used with success in a limited number of cases, but it is necessarily slow; in the largest number of cases one obtains nonelective subtotal pneumothorax with compression of the healthy lung and reduced vital capacity. Hypertensive pneumothorax also causes fibrosis of the visceral pleura overlying the diseased parenchyma, thus rendering this lung rigid, no longer susceptible to elastic relaxation and cicatricial retraction. Pleural effusion, often empyema, febrile reaction, haemoptysis, hernia and mediastinal shift, spontaneous pneumothorax, etc., are dreaded complications of a hypertensive and prolonged pneumothorax. Relapses occur in 95 per cent of incomplete pneumothoraces, as against only 5 per cent of relapses in cases that had complete collapse. Intrapleural effusion and bilateral pneumothorax are not contraindications to intrapleural pneumonolysis. When adhesions are such as to make it dangerous to divide

them intrapleurally extrapleural division may be attempted. In the experience of the authors immediate and late results of intrapleural pneumonolysis have been beneficial and several partial and ineffective pneumothoraces have been converted to effective and selective ones. Thoracoscopy should be depended upon for indicating the advisability of this operation, rather than X-ray films taken at different angles. Operative and postoperative complications of this procedure are absent to-day, due to perfected instruments and technique.—*Sulla pleurolisi infrapleurica come più frequente e necessario intervento complementare della collassoterapia pneumotoracica, C. Mazzini & D. D'Arcangelo, Lotta contro la tuberc., December, 1938, ix, 1127.*—(*S. L.*)

Pneumonolysis.—The author summarizes the results and complications of 117 operations employing the Maurer modification of the original Jacobaeus technique and the Coryllos cold cautery for intrapleural pneumonolysis on 112 cases treated during a three-year period at the Quezon Institute. The thoracoscope and the cautery, each encased in a cannula of its own, are inserted in a suitable intercostal space. The two points of entry can be used interchangeably for the thoracoscope or the cautery to facilitate approach to the adhesions. Two currents are available for this operation. The first is a high frequency current for prophylactic preliminary coagulation of tissue fluids and blood vessels in the adhesion to be cut. The second is galvanic current which heats the blunt end of the cautery and is utilized for cutting. Accidental cutting of arteries and accidental injury to lung tissue fastened by short, thick adhesions, constitute the most serious danger in closed intrapleural pneumonolysis. In such cases strong electrocoagulation was employed first and followed by the galvanocautery at a very dull red glow. In the 112 cases of closed intrapleural pneumonolysis the disease was arrested in 73 and rendered quiescent in 3. Thirteen patients were improved, 3 became worse, and 4 died some months after operation. There were no operative deaths. Hydrothorax developed in 43 cases. Pyothorax occurred in 14 cases and moderate postoperative haemorrhage in 2. A considerable number of patients were rehabilitated for work.—*Closed Intrapleural Pneumonolysis. Results and Complications in 112 Cases, M. Cañizares, Bull. Quezon Institute, July, 1939, i, 21.*—(*E. C. I.*)

Intrapleural Pneumonolysis.—The authors report the results of 150 thoracoscopies and of 137 cases of intrapleural pneumonolysis. In 13 cases extensive pleural thickening, pulmonary fibrosis, excessively vascularized tissue or constitutional risk prevented a pneumonolysis. Disappearance of clinical and bacteriological signs as well as regression of roentgenological findings followed immediately after operation in 80 cases. Improvement occurred in 34 patients while 22 remained unchanged. Three months from the date of operation tubercle bacilli had disappeared in 96 patients. The most frequent postoperative complication was pleural effusion which occurred in 52 cases. Subcutaneous emphysema was observed in 32 cases. The authors feel that this complication can be reduced by repeated doses of codeine within the first forty-eight hours following operation. Small haemorrhages occurred only in 10 cases and they could easily be controlled by haemostyptic means. Only one large haemorrhage required an additional rib resection. Tuberculous empyema developed in 9 cases and empyema of mixed type infection in 5, 3 of which were fatal. One patient developed recurrent nerve paralysis and another phrenic nerve paralysis. In 8 cases reactivation of the tuberculous lesion occurred on the side of the operation and in 3 contralateral bronchogenic spread was observed. The paper contains a large number of roentgen pictures and of colored thoracoscopic drawings which illustrate the lesions encountered. The authors feel that Jacobaeus' method should have a place in the daily practice of the phthisiologist as a necessary addition to collapse therapy. Its risk is not greater than that of artificial pneumothorax with but a few exceptions.—*Toracoscopia y Neumolysis Intrapleura, M. A. Mana & R. G. Ortega, Rev. de tuberc. d. Cuba, July, 1939, xi, 267.*—(*F. G. K.*)

Sympathetic Nerves and Phrenicectomy.—Beneficial results following phrenic nerve paralysis cannot in many instances be explained by the mechanical effects of diaphragmatic elevation or inactivity. Numerous investigators have demonstrated amyelinated fibres of the sympathetic system within the trunk of the phrenic nerve. Recent studies indicate that these fibres mediate the sensory impulses of the phrenic nerve and are responsible in part at least for the tonus of the diaphragm. The gastrointestinal disturbances which frequently follow phrenic nerve surgery cannot in all instances be accounted for by diaphragmatic elevation; disturbance of the vegetative nervous system is more likely responsible for these symptoms. Recently it has been shown that stimulation

of the phrenic nerve of dogs and guinea pigs results in pulmonary vasodilatation. Atropine inhibited this reaction. The authors attribute the diminished toxicity and lessened tendency to haemoptysis which may follow phrenic paralysis to the pulmonary vasoconstriction which results from destruction of the sympathetic fibres.—*Les actiòns sympathiques de la phrenicectomie, R. Demarez, L. Devos & J. Vandecasteele, Rev. de la tuberc., June, 1939, v, 700.*—(*H. L. I.*)

Phrenic Paralysis.—An explanation of the mechanisms of healing following diaphragmatic paralysis includes the factors of relaxation, compression, immobilization, and resultant circulatory changes. Indications for its use cannot be arbitrarily stated and results accomplished will depend largely upon the judgment exercised in its application. It is not a replacement procedure although there are a few patients for whom it is the method of choice. These cases have recent unilateral lesions limited to the lower lobe or lower portion of the upper lobe and who have wide diaphragmatic excursion. The greatest field of usefulness of hemidiaphragmatic paralysis is in conjunction with other forms of unilateral or bilateral collapse therapy, and a satisfactory result is achieved if the paralysis accomplishes the purpose for which it was recommended. The continued correct use of hemidiaphragmatic paralysis will further the advancement of collapse therapy in pulmonary tuberculosis.—*Hemidiaphragmatic Paralysis in the Treatment of Pulmonary Tuberculosis, J. H. Forsee, J. Thoracic Surg., February, 1939, viii, 272.*—(*L. F. B.*)

Extrapleural Pneumothorax.—In most cases local anaesthesia can be advantageously used in preference to general and Brock is convinced that the incidence of postoperative spread of disease can be reduced by so doing. In addition, there is less bleeding and general disturbance. General anaesthesia (for example, cyclopropane) need be added only when the patient is apprehensive or in pain and the amount of postoperative disturbance is comparatively slight, so that the procedure may be employed in pyrexic and toxic cases. The posterior route of approach is preferred as most direct and a small segment of rib, preferably the fourth, is resected. Normally a delicate layer of areolar tissue lies between the pleura and actual chest wall. In disease this is thickened and becomes a well marked fascial layer termed "endothoracic fascia." All stripping should be done between this layer and the parietal pleura. If one gets into the extrafascial plane bleeding becomes troublesome. The stripping must be adequate. The upper part of the lung must be freed not only from the lateral chest wall but also from apex and mediastinum as far as the hilum above, working both posteriorly and anteriorly. Maintenance of an extrapleural pneumothorax in the presence of limiting adhesions is even more dangerous than that of an intrapleural one; either lung rupture or haemorrhage into the extrapleural cavity may occur. Unless the apex can be freed maintenance of any space at all is highly dangerous. Obliterative adhesions are as much a problem as with intrapleural pneumothorax. Those patients whose lungs are most difficult to free usually have the severest postoperative reactions and complications. To open an intrapulmonary cavity in the process is almost invariably fatal. When, however, too little freeing has been done, the cavity may remain open. Those who still favor plombage and are searching for an ideal substance to introduce extrapleurally are strangely ignoring the advantages of ordinary air. Wax plombage is certainly obsolete and Brock believes that oil also has no proper place in the management of extrapleural pneumonolysis. Extrapleural pneumothorax is indicated when intrapleural pneumothorax fails, if the general condition is not too poor to withstand the added risk. In certain cases an interval is advisable, selecting the best time to act. In other cases, where there is a large thick-walled cavity, thoracoplasty is the only logical treatment. As to which is to be preferred, thoracoplasty or extrapleural pneumothorax, this will depend chiefly on the type of case. There exists a large group who, prior to the introduction of this procedure, were destined either to die early from their disease or to go through a prolonged period of illness until eventually thoracoplasty might be justifiably used. In these cases we can now use extrapleural pneumothorax without this long delay, during which the disease often advanced. In some of these the need for later thoracoplasty can be prevented, but in old fibrous cases thoracoplasty offers the better results with less risk. Extrapleural pneumothorax has the advantage of producing a strictly selective collapse, especially important where there is bilateral disease. It is further indicated to control bronchogenic spread in certain cases, otherwise suitable for thoracoplasty, as indicated in the foregoing observations, and in combination with other collapse procedures. In this connection attention is drawn to cases in which a large

apical cavity remains open even after expert division of all possible adhesions. In these cases after complete separation from the chest wall, the cavity is often still held out by the septum of pleura separating intrapleural and extrapleural pneumothoraces. It is only logical to divide this septum and Brock has done so in two stages on seven occasions with considerable success. Tudor Edwards has done this in a single stage. Usually a refill is given on the table at the end of the operation, another the same evening, then daily for a few days, gradually lengthening the interval. Brock is not sure, however, that so many refills are needed. Pressures much higher than for intrapleural pneumothorax are needed, readings of +12 +20 being fairly common after a few weeks. Surgical emphysema has been a less troublesome complication than bleeding into the extrapleural space. Exudate formation is at least as common as in intrapleural pneumothorax. Brock's mortality in 50 cases has been 10 per cent, but he expects it will fall as the less suitable types of cases are weeded out (he has since operated on 20 cases with no mortality). Roughly 64 per cent of patients have been favorably influenced and 16 per cent had very good results. A few have been quite dramatic. Regarding the ultimate fate of the pneumothorax, we need more data. The crucial question is whether the lung will expand when the pneumothorax is abandoned and whether it will remain healed. Doubtless thoracoplasty may ultimately be needed in a very considerable group.—*Extrapleural Pneumothorax. Views and Experiences, R. C. Brock, Brit. J. Tuberc., July, 1938, xxxii, 173.*—(*A. P.*)

Extrapleural Pneumothorax.—From January 1, 1937 to December 1, 1938, the author performed 30 extrapleural pneumonolyses. The indications for operation and the technique employed were those outlined by Graf and Schmidt. There was no operative shock or mortality and the postopertive complications were not serious. In 3 patients, preëxisting basal pneumothorax cavities were opened during operation, but these generally obliterated in a short time. External fistulae, caused by the postoperative perforation of serum through the wound, and internal fistulae, the exact aetiology of which is not known, developed in a few patients and closed spontaneously without infection after a few weeks. Fluid in the pneumonolysis cavity occurs frequently, and with the exception of 2 instances where fluid did not occur, the fluid persisted from ten days to six weeks. Simple aspirations of the fluid were sufficient, unless it became thick, and then irrigations with distilled water and *Dazet*, a benzol derivative of gold, were effective. Infected fluids, of which there were 3, required concentrated Dazet irrigations and are still under treatment. Oleothorax, 2 to 4 per cent *Jodipinol* being used for this purpose, was resorted to in 19 patients, the remainder still receiving refills with air. Of the 30 patients operated upon, 20 had bacillus free sputum for four weeks before discharge from the hospital. From the results obtained, the author believes that extrapleural pneumonolysis offers a valuable form of collapse therapy for those patients for whom other forms of collapse therapy are impossible. The uncertain fate of the pneumonolysis cavity and the prolonged after-care it requires should not detract from its value as a collapse measure.—*Erfahrungen in der Technik und Nachbehandlung der Pneumolyse bei kavernöser Oberlappentuberkulose, A. Emmler, München. med. Wchnschr., February 10, 1939, lxxxvi, 208.*—(*A. B. C.*)

Extrapleural Pneumothorax.—Operative and postoperative techniques are described. Of 28 operations at the Brompton Hospital, London, 3 were in very severely ill patients and primarily palliative. Following the other 25, cavity or cavities have disappeared in 18 patients. In the last 16 there have been no serious complications. When stripping has been adequate there has been no tendency to obliteration. The final value of the procedure cannot yet be pronounced. The operation is indicated in cases susceptible of reëxpansion after healing; in cases where either the general or local conditions contraindicate thoracoplasty; in children and young people generally in preference to thoracoplasty. Where permanent collapse is desired and the patient fit, a combination of upper thoracoplasty and Semb's extrafascial apicolysis is generally preferable.—*Extrapleural Pneumothorax, J. E. H. Roberts, Brit. J. Tuberc., April, 1938, xxxii, 68.*—(*A. P.*)

Extrapleural Pneumothorax.—Extrapleural pneumothorax is the most advanced form of surgical apicolysis and has the advantage over other surgical procedures in that it frees the lung more completely and with less traumatism. The posterior approach is most frequently used because most lesions are located centrally and posteriorly, but if the cavity is near the anterior costal arch an anterior approach may be used. Effective collapse by the posterior approach rarely goes beyond the seventh rib posteriorly and the first costal cartilage anteriorly, and by the anterior approach, effective collapse

extends to the lower border of the third costal cartilage and the fifth or sixth rib posteriorly. For four or five days after operation care must be taken not to allow too high or too low pressure in the extrapleural space, but after the operative suture has become air-tight, pressures can be increased. Refills are given often during the first ten to fifteen days. In the event of progressive readhesion, the pocket can be blocked off with oil. Other than complications resulting from decrease or increase in pressure, haemorrhage into the space may occur, or perforation of the cavity may occur either at the time of operation or later through necrosis of the cavity wall. Suppuration of a postoperative effusion may occasionally occur. Indications for the procedure from the anatomoclinical standpoint are: the lesion must be well localized and not be extensive, dense, ulcerocaseous or fibrocaseous in type; only apical or subapical lesions can be collapsed; the cavity should be small and centrally located. Subcortical lesions should not be operated upon. From the clinical standpoint, early lesions respond better than others and should be quiescent or slightly active only. The operation may be performed in children, and during pregnancy, in the presence of bilateral disease, on certain basal lesions, and it may be done in two stages. Intrapleural pneumothorax is the method of choice, but if it is not effective should not be long continued. If the apex of the lung is adherent, a mixed intrapleural and extrapleural pneumothorax may be given, the pleura between the two pockets being sectioned. The indications for extrapleural pneumothorax are more numerous than for thoracoplasty. Thoracoplasty has the advantage of permanence of results and of not requiring refills. In patients with poor natural defenses in whom the lesions are active, thoracoplasty is dangerous and extrapleural pneumothorax may be undertaken. It will not be possible to compare results of the two procedures until after at least ten years have passed.—*Technique, Indications, and Maintenance of Extrapleural Pneumothorax, M. O. Monod, J. Thoracic Surg., December, 1938, viii, 150.*—(*L. F. B.*)

Extrapleural Pneumothorax.—Following previous attempts at extrapleural pneumothorax, Nissen, by 1931, had applied extrapleural pneumothorax systematically in a large series of patients in whom the nature or extensiveness of the lesion left no hope for other surgical methods of treatment. Certain considerations taken into account before using this method were unsuccessful phrenicectomy, unsuccessful intrapleural pneumothorax because of vast adhesions, patients physically unable to stand a thoracoplasty, plombage contraindicated because of the extensiveness of the lesion. Using Meyer's method involving a small costal resection, through the breach an extensive separation of the lung was performed. Pulmonary retraction was satisfactory in all cases. Late haemorrhage was never observed, although early there was almost regularly a moderate haemothorax. No other complications appeared except an interstitial cutaneous emphysema during the first few days after the intervention. Four days after the operation insufflations of air were started just as in intrapleural pneumothorax. Because of considerable thickening of the pleura it was necessary to use high positive pressures. Because this method of treatment was used only in patients whose general conditions seemed hopeless successful results were obtained in only 2 cases, 3 others died of their disease without any complication directly attributable to the operation. In one patient the extrapleural pneumothorax contributed to a flare-up in the other lung which was already seriously affected. The publication of Schmidt and Alberger credits Graf with the idea of extrapleural pneumothorax but Graf himself mentions Nissen's priority in the procedure. After eight years' experience Nissen has formed a definite opinion as to the advantages and disadvantages of the method. He uses extrapleural pneumothorax only in tertiary cavities with marked induration of the wall, when, because of a poor general condition of the patient or the presence of vast adhesions, other forms of therapy are contraindicated. Plombage is used to close small cavities in the apex or hilum of the lung, rather than extrapleural pneumothorax. The author has not observed following extrapleural pneumothorax serious complications, such as infection or emphysema of the mediastinum. One case suffered perforation of a cavity resulting in a fatal issue. Even though the extrapleural pocket is completely free of blood at the close of the operation, a bloody effusion is always produced and recurs after each aspiration so that it is better not to aspirate. In some instances a permanently satisfactory result is impossible because the cavity closes insufficiently in spite of sufficient pneumonolysis and high pressures. Following cessation of the treatment, reëxpansion of the lung is rapidly produced. In some cases, after a period of treatment with extrapleural pneumothorax, attempts at reëxpansion are unsuccessful and the extrapleural cavity fills with exudate which necessitates regular aspirations; in 2 of the cases the exudate was subsequently

infected and a thoracoplasty was necessary to close the cavity. During the course of extrapleural pneumothorax a thoracoplasty can be done if the general condition of the patient and the contralateral lesion permits it. Incontestable results are obtained only in cases where after a satisfactory pulmonary collapse from the beginning the extrapleural cavity shows a tendency to progressive shrinking. There results a fibrothorax behind which there cannot be established clinically or radiologically the remains of cavities. In some patients cure was obtained in the presence of a contralateral lesion which became clinically inactive. With recent cavities formed during the active stage of the disease the results were essentially the same. In these cases thoracoplasty is contraindicated. Aspiration into the inferior lobes on the diseased side does not occur because the collapsed lung has homonymous not paradoxical respiratory movements. The principles of the treatment differ in no way from those of the classic pneumothorax except that the pressure should always be kept positive. One advantage over the classic pneumothorax is that the retraction of the lung can be limited at a level with the cavity and its proximity. Very rarely has the author been obliged to add a thoracoplasty to the treatment of insufflation for in the great majority of cases the lung comes out to the thoracic wall. As to the technical execution of this method, the author has used the paravertebral, the anterior and the axillary approach, and has found them all very satisfactory.—*Le pneumothorax extra-pleural, R. Nissen, Arch. méd. chir. de l'app. respir., 1938, xiii, 196.*—(*J. E. F.*)

Extrapleural Pneumothorax.—The authors review their experience with 40 patients in whom extrapleural pneumothorax was established. Peripleural adhesions occasionally made the operation impossible; this difficulty was encountered with fresh disease as well as with old fibrotic lesions. The authors perform the operation under local anaesthesia with the patient sitting. An anterior or posterior incision is made, depending upon the site of the disease. The decollation should extend at least two interspaces below the diseased portion of lung. In maintaining the pneumothorax space, positive pressures should be avoided the first few days because of the danger of mediastinal emphysema. Subsequently pressures as high as +16 are well tolerated, but as a rule the pressure is maintained at +4 or +6. A serosanguineous effusion is an almost constant, but usually transient development. Obliteration of the pneumothorax space by symphysis is common, and oleothorax should be employed. Postoperative complications included two instances of complete loss of the space, probably due to leakage into the mediastinum. Cavity rupture occurred as the result of operative trauma and postoperatively due to ischaemia of the cavity wall. Postoperative effusions were common, but as a rule quickly disappeared. The authors recommend wider application of this method of collapse. Large cavities, and dense, rapidly progressing lesions cannot be successfully treated. Extrapleural pneumothorax should be an operation of choice for less extensive lesions when intrapleural pneumothorax is not wholly successful. It may be used in children, and in pregnancy when thoracoplasty is not feasible, as well as in patients considered too ill for thoracoplasty. Patients with intrapleural pneumothorax with unsatisfactory collapse of the apex may have extrapleural apicolysis. The extrapleural and intrapleural pneumothorax spaces may be united at the time of operation or at a second stage.—*Du pneumothorax extra-pleural. Monographie d'apres 40 cas., Monod, Oliver & Garcia-Bengochea, Rev. de la tuberc., July, 1938, iv, 741.*—(*H. L. I.*)

Pneumonolysis, Extrapleural Pneumothorax and Oleothorax.—Pneumonolysis creates a free cavity which plays the rôle of an extrapleural pneumothorax, the latter maintaining the pulmonary collapse created by the surgical intervention. The authors perform a short, rectangular incision parallel to the border of the scapula from the second to the sixth rib, the arm being previously set in abduction. The attachments of the trapezius are sectioned exposing the rhomboideus which is divided by dissociating the muscle fasciculi. The breach is then widened and a subperiosteal resection of the fourth rib, for a length of almost 6 cm., is made. After resection of the vasculo-nervous pedicle of the rib, the endothoracic fascia is incised. This endothoracic fascia corresponds to the more or less transformed tendinous connective tissue attachment of the internal intercostal muscle to the periosteum. Following this procedure one comes directly to the parietal pleura. Using sponges, the pouch created at first with the finger under the endothoracic fascia is enlarged with the aid of a lighted probe, keeping internal contact with the thoracic wall. By isolating adhesions and sectioning the pedicles by diathermic coagulation one can free the lung and its pleural leaves from its attachment to the thoracic wall. The degree of pneumonolysis is adapted to the dimensions of the patient's

lesion and to the cavities which necessitated the operation. In all cases the apex is freed at a level of the second rib anteriorly and the sixth rib posteriorly at the mediastinum allowing the lung, freed from the ribs, to sink into the pneumonolysis cavity. After completion of the separation, and after careful haemostasis, the thoracic wound is sutured. From this point on the procedure of extrapleural pneumothorax may be added. The first insufflation is made as soon as one notes reduction of the collapse surgically created. Insufflations are usually biweekly. The pneumothorax needle is introduced in the zone of resection denervated by the extirpation of the intercostal nerve. A short beveled needle is used, connected to a standard pneumothorax apparatus, recording pressures before and after the insufflation. Pressures in the pneumonolysis pocket are not as highly negative as in intrapleural pneumothorax being usually approximately zero and showing only minimal respiratory oscillations. The final pressures are much higher than in intrapleural pneumothorax, for final pressures are pushed to a positive pressure of +8 or +10 cm. of water after 200 cc. of air. Gradually the pneumothorax pouch wall becomes thickened so that pressures must be raised as high as +20, using less air (100 to 150 cc.). Such positive pressures are essential or there will be retraction of the pneumonolysis pouch. If a retraction of the air pocket is produced in spite of careful maintenance of the extrapleural pneumothorax then the air should be replaced by oil or liquid paraffin. The opportune moment for replacing the air with oil should not be missed for only rarely can the collapse be increased. For this reason it is better to start oleothorax when there is still both adequate reserve collapse when it is unnecessary to fill totally the pneumonolysis pocket. A test injection of 20 to 50 cc. of oil is made using a short beveled needle of 2 to 3 mm. in diameter. The pocket is then filled with oil leaving a small amount of air at the apex. If intolerance for the oil is produced, expressed clinically by fever and an exudate in the pneumonolysis pocket, and if it does not recede after several days it is necessary to withdraw the oil and test the tolerance to another oil. The following oils are used, pure liquid paraffin, gomenol paraffin (liquid paraffin with the addition of 4.5 per cent gomenol); 4.5 per cent gomenol in olive oil, and iodipinol of 5, 10, 20 and 40 per cent strength (Merck). Iodipinol has the advantage of being very opaque to X-rays and of being heavy. It is particularly indicated when it is necessary to obtain a high pressure in the pneumothorax pockets with underlying parenchymal cavities. Liquid paraffin differing from the oils cannot be saponified or resorbed. Lately the authors have used a combination of one part liquid paraffin to ten parts of 20 per cent iodipinol. Exploratory punctures to ascertain oleothorax pressures and to determine presence of exudate are indicated even after stabilizing of the pulmonary lesions. There is danger of perforation by virtue of abnormally increased pressures due to progressive shrinking of the pocket and due to production of exudates. If exudate has formed it should be aspirated and replaced by an appropriate quantity of oil. When the oleothorax should be abandoned is an individual proposition depending on the case in question. If a natural plombage results, due to increasing connective tissue formation, the oleothorax may be abandoned earlier than in cases where there is little connective tissue formation. Exudates in the pneumonolysis pocket appear very frequently and are of little significance unless infected. Haemorrhagic exudates are aspirated when an undesirable pressure develops in the pocket or if fever appears. Aspirations are done. Liquid exudates are easily aspirated but thick coagulated material must be washed out with physiological saline or boric acid. The formation of coagulated exudate is tied up with postoperative haemorrhage in the pneumonolysis pocket which in spite of careful haemostasis at the time of the surgical intervention cannot be avoided. In the majority of cases it occurs during the first six to twenty-four hours following the operation, expressed clinically by increased pulse rate and decrease in haemoglobin, but is rarely of important proportions. It usually does not assume the gravity of internal haemorrhage necessitating transfusions, although it is good precaution to be ready to transfuse. If haemorrhage fills the pneumonolysis pocket causing respiratory embarrassment, aspiration is justifiable, use of a large trocar being necessary because of rapid coagulation of the blood. Unless respiratory difficulty appears it is better to wait several days or weeks before aspirating the coagulated blood which by then has become liquefied. Frequent exploratory punctures are necessary to determine when the blood has liquefied. Transformation of the clear serous exudate into a purulent exudate should not necessarily be considered as an infection, in fact aseptic suppurations are not exceptionally of good prognosis. Such exudates are treated in the same manner as ordinary exudates. If bacteria are present it is necessary to wash the pocket frequently with an antiseptic solution.

Infections with nonhaemolytic cocci such as staphylococci, pneumococci and colon bacilli are not as severe as the haemolytic cocci. With the latter there are usually toxic manifestations and often gangrene of the pleura and lung. These malignant suppurations may happen after perforation of a lung cavity into the pocket, but they can be completely avoided by placing rigorous indications for pneumonolysis. The source of such suppurations may be through the external wound, or through the cavitary wall following production of an internal fistula. The perforation of the wall of the pulmonary cavity happens when the caseous pneumonic process in the lung extends into the pneumonolysis pocket. In 40 per cent of cases the suppuration in the pneumonolysis pocket was due to tubercle bacilli. Certain indications may be outlined to insure the success of the treatment of pulmonary tuberculosis by pneumonolysis and extrapleural pneumothorax or oleothorax: presence of a cavity; failure of conservative treatment; stabilization of the disease process, exclusion of evolutive forms, exudative or caseous; proof that adhesions preventing intrapleural collapse or adhesions not amenable to the Jacobaeus operation are present; absence of rigid walled cavity and absence of cirrhotic pulmonary involvement; dimensions of cavity on standard X-ray films not exceeding 5 cm.; seat of cavity not very superficial when it is subclavicular; extension of the cavity on X-ray films must not be beyond second rib in front and sixth rib in back; absence of more important extensive lesions of the contralateral lung.—*La pneumolyse suivie de pneumothorax ou d' oléothorax extra-pleural comme méthode de collapsothérapie dans le traitement de la tuberculose pulmonaire, W. Schmidt & K. Briest, Arch. méd. chir. de l'app. respir., 1938, xiii, 202.*—(*J. E. F.*)

Extrapleural Oleothorax.—The authors present a provisional line of conduct that should be kept in mind following the extrapleural apicolysis. There does not exist any relationship between the indications for extrapleural oleothorax and those for intrapleural oleothorax. Extrapleural oleothorax will almost always be a maintenance oleothorax because it has for its object the avoidance of or to arrest the obliteration of the extrapleural space. The procedure is a matter of necessity usually from three to six months after the operation. The oleothorax becomes effective only if an effective relaxation has been accomplished by the extrapleural pneumothorax. At the operation the space created extends well beyond the site of the lesion and the progressive reduction of this space is carefully watched with serial roentgenograms taken in inspiration and also in the dorsal decubitus position. The obliteration may be as much as an interspace and a half in one month. The authors preferred to use 5 per cent gomenol in order to avoid any iodine reaction which may be obtained through the use of lipiodol. However, because gomenol is rapidly absorbed at the beginning, they sometimes injected 20 cc. of 40 per cent lipiodol at first and then followed with the 5 per cent gomenol. The authors point out that the pulmonary tissue will react differently to oils depending upon whether vegetable, mineral or animal oil is used. They found, in a study of histological sections of the pleural wall, pockets covered with a pseudoepithelial lining and in which there were macrophages filled with fat globules. The oil injected can be as readily absorbed by the lung as the wall of the space. It is therefore necessary to give careful attention to the nature and the proportion of the oils used. They never used liquid paraffin. Several complications were noted. The provocative effusion was almost a constant finding, usually occurring about forty-eight hours after the first injection and usually found only by careful fluoroscopic examination. In some instances of intolerance to the oil an exudate formed accompanied by fever and gastrointestinal symptoms. The sensitivity of the patient is best tested with the instillation of small quantities of oil at first. The spontaneous type of pleural effusion evolved slowly and unobtrusively and manifested itself by a sensation of weight and by its abundance may cause a perforation. In 2 per cent of the cases the authors found an aseptic empyema by the process of saponification of the oil following an inflammatory reaction of the wall which in turn provoked an abundant leucocytosis and the liberation of their lipases which resulted in saponification. This complication is accompanied by fever, thoracic pain, weight loss and malaise. The regression of these clinical symptoms is seen quickly after the saponified material is removed and the space washed out with serum. In one instance the emulsified material injected into a guinea pig caused tuberculosis. Perforation was another complication but is rare if the cases are well chosen. Although the authors feel that the use of early and properly spaced pneumothorax refills will retard the obliteration of the space they feel that sooner or later the maintenance extrapleural oleothorax will be the end stage of the extrapleural apicolysis and is the only effective means of maintaining an effective and selective collapse for two or three years. They have followed

oleothorax cases of six to fifteen months' duration. Schmidt blockaded 45 per cent of the extrapleural pneumothorax cases in the first six months and by the end of the first year the percentage rose to 63. It is difficult to determine in advance which cases will obliterate. This procedure has the advantage over the paraffin plombage because one cannot foretell the reaction after the plombage and in order to remove the paraffin in cases of intolerance and after perforation a more formidable procedure is necessary. Whereas the formation of a fibrous wall, the ability to test the patient's sensitivity to the oil by the use of small amounts at spaced intervals, to remove the oil easily by simple aspirations in cases of intolerance and lastly the progressive and partial absorption of the oil are all advantageous. They also feel that this procedure is of greater advantage than that of the revision thoracoplasty because it is difficult to convince a patient to undergo another operative intervention especially if there is little or no expectoration, the sputum is negative, the weight has increased and the temperature is normal. The extrapleural oleothorax should not be created in a technically ineffective extrapleural apicolysis or which does not become effective within six months as manifested by the closure of the cavity, because of the danger of perforation, or instituted where an effusion is present or in cases with recurring effusions with or without pus, or to avoid pneumothorax refills and in order to enlarge the space by pressure. On the other hand the authors advise frequent and early aspirations where effusion is present to observe the progress of the symphysis, to create the oleothorax at the opportune moment depending upon the site of the lesion and the rate of obliteration, to use gomenol in preference to animal and mineral oils, to use small frequent injections as a test of sensitivity and to prevent a too rapid absorption of the oil and lastly, to watch carefully the pressure and the condition of the oil.—*L'oléothorax extra-pleural, G. Lardennois, O. Monod & J. Garcia-Bengochea, Ann. méd.-chir., December, 1938, iii, 317.*—(*M. A. B.*)

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alimentary in 50 per cent, aerogenous in 40 per cent and cutaneous in 10 per cent. The aerogenous source of infection occurred mostly with the human type and the alimentary with the bovine type tubercle bacillus. The different kinds of degenerative and actively progressive lymph node reactions in the primary complex are discussed. A series of cases regarded as chronic isolated organ tuberculosis are emphasized and a series of cases of chronic tuberculous pleuritis, certain forms of tuberculous pericardial-myocarditis and of liver tuberculosis are also considered. The author considered chronic hypertrophic periostitis not to be of tuberculous nature.—*Ansteckungsquelle für den Menschen über Tuberkulose bei Hunden und Katzen, A. Hjärre, Acta tuberc. Scandinav., Fasc. 1–2, 1939, xiii, 103.*—(*F. B. S.*)

Tuberculosis in Domestic Animals.—It has long been known and proved that dogs and cats are easily infected by both human and bovine tubercle bacilli. Previous to 1925, cases were rarely found, but the infection is steadily increasing. In Italian veterinary schools to-day it is found that 1.45 per cent of cats and 0.60 per cent of dogs examined show tuberculosis; these percentages are obviously below the true infection rates, because but few animals are brought in for examination. Nain and Prudhomme established by autopsy a case of miliary tuberculosis in a dog belonging to a watchman of an abattoir. The dog had fed on offal and on fresh milk from cows awaiting slaughter. Culture and inoculation of material from this dog disclosed tubercle bacilli of bovine type. The dog had died after an hour of acute illness, but old lesions were also found at autopsy and the dog had been in noticeably poor condition for some time. Strict measures should, therefore, be taken to prevent dogs from roaming on the premises of abattoirs, meat markets, etc. A review of the literature discloses that Italian observers have published articles on this subject since 1882. A recent study (1936) places the amount of infection at from 2 per cent to 15 per cent. The conclusions are that infection between domestic animals and man is reciprocal; that animals are usually infected through ingestion of infected food; that tubercle bacilli are eliminated in considerable quantity through secretions and excretions. The elimination of strays and of animals from the homes of the tuberculous would be an important addition to the campaign against tuberculosis.—*La tubercolosi dei carnivori domestici e il pericolo di contagio dell'infezione all'uomo, P. Sansonetti, Lotta contro la tuberc., August, 1938, ix, 762.*—(*S. L.*)

Sensitization of Cattle to Tuberculin.—There have occurred with increasing frequency instances in which positive reactions to tuberculin could not be satisfactorily explained either by the demonstration of tuberculous lesions or by the presence of definitely tuberculous cattle within a given herd. It is generally recognized that swine are readily infected by the avian tubercle bacillus but the severe and aggravated disease set up in heterologous hosts by this organism is not always appreciated. Although the total number of reported instances of avian tubercle bacilli in the tissue of cattle is not large, sufficient information is available to establish the fact that these bacteria may be responsible for at least minimal lesions and cause a sensitization not only to avian tuberculin, but also in some instances to mammalian tuberculin. From a considerable number of investigations a number of facts have been established: cattle can be infected experimentally with avian tubercle bacilli; extent and severity of disease depend on the age of the animal, route of infection and virulence of the particular strain used; when injected intravenously severe and often lethal disease results; when inoculated subcutaneously the disease is well tolerated and usually limited to regional lymph nodes; following ingestion, lesions are usually established in the lymph nodes of the alimentary canal and lesions may develop in the intestinal mucosa; exposure to avian tubercle bacilli results in most instances in sensitivity to avian tuberculin and in some instances to mammalian tuberculin. Instances in which the disease was generalized have not been reported. In cases of natural exposure the sensitivity to avian tuberculin is usually transitory and eventually disappears if the animals are moved to a noninfected environment. Observations of Plum, of Denmark, suggest that a reaction to mammalian tuberculin occurs in the majority of cattle harboring avian tubercle bacilli but the reaction is of substandard dimensions. It seems not unlikely that in the United States the avian tubercle bacilli sensitize more cattle to mammalian tuberculin than is generally recognized and that at least some of the nonvisible-lesion reactors may be in this group. In areas where fowl tuberculosis is prevalent, sensitivity to avian tubercle bacilli should be seriously considered in reacting cattle from herds in which it is reasonably certain that infection with bovine bacilli has not occurred.—*The Role of the Avian Tubercle Bacillus in the Sensitization of Cattle to Tuberculin, W. H. Feldman, J. Am. Vet. M. A., August, 1939, xcv, 152.*—(*L. F. B.*)

Bovine Tuberculosis in Sheep.—Because tuberculosis in sheep is rare, few cases have been typed. Among 34 cases reported in the literature, 27 were avian in type, 6 mammalian or bovine in type and 1 was human. The authors report a case of generalized tuberculosis in a sheep. The pathogenicity of the organisms recovered for guinea pigs and rabbits seemed to indicate that the organisms were bovine in type. It was considered worthy of note that the strain was pathogenic for a chicken.—*A Case of Sheep Tuberculosis Due to the Bovine Type, E. L. Stubbs & I. Live, J. Am. Vet. M. A., August, 1939, xcv, 173.*—(*L. F. B.*)

Tubercle Bacilli in Swine.—Meat inspectors in a large midwestern city found tuberculous lymph node lesions in 75 or 28.4 per cent of a group of 264 garbage-fed hogs examined. The author demonstrated tubercle bacilli by culture and guinea pig inoculation in the diseased lymph nodes of 47 of these 75 animals. By subculture and pathogenicity tests, it was found that 35 or 74.5 per cent of the strains were of the avian type, and 12 or 25.5 per cent were of the human type. The failure to demonstrate bovine tubercle bacilli is considered significant evidence of the success achieved in eliminating tuberculosis from cattle. It appears probable that the garbage fed contained a considerable amount of offal from tuberculous fowl, indicating that tuberculous chickens are commonly sold for food. Similarly, the evidence indicated improper disposal of infective material from humans with tuberculosis. Swine infected with human tubercle bacilli, however, are not a serious health hazard to the community if there is an adequate meat inspection service. —*Types of Tubercle Bacilli in Lesions of Garbage-Fed Swine, W. H. Feldman, Am. J. Pub. Health, November, 1939, xxix, 1231.*—(*H. L. I.*)

Avian Tubercle Bacilli in Poultry.—The question has been raised as to whether apparently healthy fowl, from districts where avian tuberculosis is prevalent, may not harbor avian tubercle bacilli. In "dressed" fowl tangible evidence of tuberculosis may be absent, for the lesions of fowl tuberculosis occur most frequently in the viscera which are usually removed in the process of "dressing." From a local market (Rochester, Minnesota) the intact spleen was obtained from poultry intended for sale. The spleen was removed aseptically at the time the fowl was eviscerated and placed in a sterile container for transportation to the laboratory. None of the fowl showed any gross evidence of tuberculosis; all were in good condition. In the laboratory the entire spleen was suspended in 5 cc. of sterile physiological salt solution, and after partial settling the suspension was treated with 5 per cent oxalic acid according to the method of Corper and Uyei. Following centrifuging the sediment was seeded on Herrold's egg-yolk agar containing 3 per cent glycerine. The spleens of 125 dressed poultry were examined by this method and positive results were obtained in four instances. The fowl in the series studied consisted of 66 "springers," 30 adult hens, 3 capons, 4 turkeys, 18 domestic ducks and 4 wild ducks. The four strains of avian tubercle bacilli were obtained from 1 springer, 2 adult hens and 1 domesticated duck. Each strain of the microörganism secured was definitely identified as of the avian type by further culture and by tests for pathogenicity. Dressed poultry originating from districts where fowl tuberculosis is prevalent may harbor avian tubercle bacilli of standard virulence even though recognizable morbid changes be absent. The presence of these bacilli in fowl without gross evidence of disease emphasizes the difficulty of eliminating every tuberculous fowl even by competent methods of poultry inspection. There seems to be no practical method of postmortem examination that will disclose the presence of tubercle bacilli in the absence of gross lesions. Apparently, poultry will have to be raised in a nontuberculous environment if the ultimate consumer is to be supplied with a product not likely to be infected with tuberculosis.—*The Occurrence of Avian Tubercle Bacilli in Dressed Poultry, W. H. Feldman, J. Infect. Dis., November–December, 1938, lxiii, 333.*—(*J. S. W.*)

Tuberculosis in Wild Mammals.—Wild mammals not in captivity never develop spontaneous tuberculosis, while those in menageries and zoological gardens quite readily contract the disease. The author quotes necropsy findings in primates (chimpanzees) which revealed tuberculous lesions (human strain) in liver, lungs and spleen. A case is cited where avian bacilli were isolated from a baboon, presumably due to ingestion of infected eggs. Proved cases of spontaneous tuberculous infection in carnivora, that is, lions, are cited from the literature due to bovine or human strain. Conclusions: (*1*) Of all wild mammals held in captivity, the monkey is most susceptible to tuberculosis; next in order are the ongulates. (*2*) From the 30 monkeys examined, tubercle bacilli were isolated; twenty-five were human strain, four bovine and one avian. (*3*) Tuberculin can be used to

determine the presence of infection except in monkeys in whom the test is inconstant and transitory. (4) The complement fixation test (Besredka) with a good antigen is of diagnostic value in monkeys and the other mammals. (5) Prophylaxis for animals held in captivity is best effected by absolute isolation on their arrival; tuberculin and serum diagnostic tests for susceptibility and their "contacts" are to be placed near other animals in whom these tests are negative.—*L'infection tuberculeuse spontonée chez les mammifères sauvages en captivitè, A. Urbain, Ann. Inst. Pasteur, December, 1938, lxi, 705.*—(*J. G.*)

Acid-fast Bacilli in Vipers.—From cultures of 25 vipers, acid-fast bacilli were recovered three times, one from nodular lesions on the wall of the intestine, another from a hepatic lesion and the third from liver and pancreas. All were atypical culturally and microscopically. Only one strain when suspended in physiological salt solution produced lesions when inoculated intraperitoneally into guinea pigs. About ten days after the inoculation fine granulations were found on the entire surface of the lungs. These granulations contained large numbers of acid-fast bacilli. This same strain together with another strain produced exudative peritonitis when inoculated intraperitoneally and emulsified in sterile butter. The third strain provoked no lesions either when emulsified in butter or in normal salt solution.—*Bacilles acid-rèsistants chez les vipères, Th. Voiculescu, Compt. rend. Soc. de biol., June 10, 1939, cxxxi, 583.*—(*M. T. W.*)

Transient Pulmonary Infiltrates.—In a group of 1,220 new cases seen in a tuberculosis clinic, 29 presented transitory, localized pulmonary consolidations. Included in these 29 cases were 4 cases of unresolved pneumonia, 4 cases of lobar atelectasis without symptoms, and 21 cases which the authors believe to be aspiration pneumonias secondary to catarrhal upper respiratory infections. Because of the paucity of constitutional symptoms, the negative laboratory findings, and the benign, brief course of the latter lesions, the term "benign circumscribed pneumonia" is considered appropriate to describe them.—*Benign Bronchopulmonary Inflammations Associated with Transient Radiographic Shadows, H. Ramsay & J. G. Scadding, Quart. J. Med., April, 1939, viii, 79.*—(*A. B. C.*)

Transient Pulmonary Infiltrations in Children.—There are reported 3 cases of transient lung consolidation in asthmatic children who were repeatedly negative to more than 1.0 mg. of OT. They are thought to represent instances of Loeffler's disease, although not showing the high eosinophilia he described. The lung changes and their duration of only a few hours were confirmed by X-ray. The transient lung shadows suggested massive indurations of atelectatic type.—*Transient Lung Consolidations in Asthmatic Children with Reference to Eosinophilia, B. Söderling, Arch. Dis. Childhood, March, 1939, xiv, 22.*—(*M. B.*)

Pneumococcic Pneumonia.—At Johns Hopkins Hospital and Union Memorial Hospital during the past year, 50 patients with pneumococcic pneumonia of nine different types were treated with concentrated antipneumococcus rabbit serum. Eight patients with type-III pneumonia were treated and 4 died, the serum seeming to be relatively ineffective with this type. For the remaining 42 patients the fatality rate was 14.3 per cent, although 26 per cent of the patients had bacteraemia and a like number had multilobar consolidation. Excluding the patients with type-III pneumonia, all the patients who failed to survive had more than one lobe involved and all except one had more than five colonies of pneumococci per cc. in the blood culture. The incidence of empyema was 7 per cent. Thermal reactions were relatively common, occurring in 26 per cent of the patients, and delayed serum sickness developed in more than one-third of the patients.—*Treatment of Pneumococcic Pneumonia: With Concentrated Antipneumococcus Rabbit Serum, W. B. Wood, Jr., J. A. M. A., August 26, 1939, cxiii, 745.*—(*G. L. L.*)

Interstitial Pneumonitis.—In a fifteen-month period quite free of pandemic influenza, the authors observed among the 6,569 students at Cornell University an epidemic of 86 cases of acute infection of the respiratory tract in which roentgenograms of the chest revealed typical fan-shaped areas of increased density. These areas of density were apparently not areas of true consolidation or pneumonia. This type of infection seemed to be different from anything seen previously. It was apparently a new acute disease of the respiratory tract having as its cardinal feature specific lesions in the lungs inaudible to the stethoscope but definite in the roentgenogram of the chest. To this disease the authors apply the term acute interstitial pneumonitis. A review of the roentgenograms leads to the conclusions that definite X-ray evidence may not appear until from thirty-six to forty-eight hours after the clinical onset, the infection spreads

from the hilum outward, following the bronchial and vascular tree, as do many other pulmonary infections. The onset has been marked by increased density in the hilar shadows, with a fan-shaped localized accentuation of and a numerical increase in the linear pulmonic markings extending from the hilum into the adjacent lung field. This extension is down into the base in the majority of cases; it may be lateral or, not infrequently, into the first and second interspaces. In one group of cases, there then appeared over this area a diffuse even increase in density, which was not sufficient to eliminate the linear markings and suggested an intense congestion rather than a true consolidation of lung tissue. The visible changes did not usually extend to the margin of the lung, and they cleared rather rapidly. In a second group of cases, of more serious involvement, the infiltration extended more frequently to the periphery of the lung, with irregular areas of markedly increased density suggestive of lobular involvement and more typical of definite bronchopneumonia. Resolution was correspondingly slower than in the first group. In about 5 per cent of the cases the involvement was severe. The development was similar to that in the preceding groups except that, in addition to the original focus, there was a diffuse spread throughout the remainder of the lung with partial or complete involvement of the other lung. Clearing of the lung fields was slow, taking from one to two and one-half months. Onset is gradual over a period of several days, with moderate fever and little or no sputum. In many cases the fever rises later to about 104°F., and the symptoms suggest development of pneumonia, but sputum is lacking or scant. In the most severe cases there is sudden sharp fever and toxicity, with moist râles, but still scanty sputum. The pneumonitis terminates by lysis. The authors do not feel that this disease is an atypical pneumococcic pneumonia, but feel that it is more infectious than pneumonia, and as a routine all cases are isolated.—*Acute Interstitial Pneumonitis: A New Disease Entity, D. F. Smiley, E. C. Showacre, W. F. Lee & H. W. Ferris, J. A. M. A., May 13, 1939, cxii, 1901.*—(*G. L. L.*)

Pulmonary Fibrosis.—This subject has an important relation to certain trades and occupations because of the association of both tuberculous and nontuberculous factors in its production. So-called fibroid phthisis has been recognized for some time. Among other causes of fibrosis are pneumonia, long-standing bronchitis, dust inhalation, lung collapse, trauma, syphilis, alcohol and bronchiectasis. Recently, the rôle of infantile bronchopneumonias has been recognized while syphilis has lost ground. Only dust consisting of small particles in a high degree of concentration can penetrate the normally functioning defenses of the respiratory tract but previous respiratory disease or abnormalities impair these defences. Pulmonary fibrosis is divided into three types, peribronchial, interstitial or lobular and perifocal. Although none of these is found exclusively, usually one or another predominates and has its particular associated clinical features or complications. Peribronchial fibrosis is associated with chronic bronchitis, interstitial or lobular fibrosis with chronic interstitial pneumonia, proliferative tuberculosis and diffuse silicosis and perifocal fibrosis with exudative tuberculosis and nodular silicosis. In peribronchial fibrosis there is degeneration of the mucosa and shedding of cilia, also atrophic or degenerative changes in lymphatics and small blood vessels. In interstitial fibrosis there is thickening of the interlobular septa with a round cell infiltration. In perifocal fibrosis the fibrous tissue surrounds a caseous or silicotic core, the typical feature of the latter being a whorled or laminated nodule which grows in size by accretion. In infective silicosis the process is associated with a bacillary infection, usually tuberculous. Causes of pulmonary fibrosis in order of frequency are: tuberculosis, silicosis, pneumonias, chronic bronchitis, respiratory irritants and old age, pleurisy, alcohol, syphilis and other rare causes. Interstitial fibrosis complicating childhood bronchopneumonias is associated with recurrent winter bronchitis. The physical signs are due to pulmonary oedema or congestion rather than to inflammatory exudate. The symptoms often appear rather suddenly following recovery from whooping cough or measles and may disappear with puberty although some pulmonary signs may persist. In the more severe cases bronchiectasis or emphysema results. Applicants who give a history of pneumonia or pleurisy are not accepted by the Miners' Phthisis Bureau. Silicotic fibrosis is quite variable in its manifestations and mode of development, with the individual physique playing some part. Tuberculous fibrosis is essentially perifocal, encapsulating necrotic areas, and secondarily interstitial, causing contraction, decreased blood flow, decreased expansibility and anoxaemia. The localized interstitial forms give physical signs rivalled only by pleurisy and due to changing physical properties of the lung. The more characteristic signs in tuberculosis, as well as in any nontuberculous lesions, are associated with

fibrosis and even cavity signs are usually absent unless there is some fibrosis. Peribronchial fibrosis is much less recognizable, as a rule, although the silicotic type has certain features which, taken in conjunction with the history, are quite characteristic. The roentgenographic evidence is of particular interest because so often wrongly interpreted. In the diagnosis of fibrosis *per se*, the X-ray evidence is of less importance than in early tuberculosis or cavitation. Fibrosis is much too freely diagnosed in pulmonary tuberculosis. It may come as a shock to find that supposed "scars" have later disappeared. The question of activity should be decided on other and better evidence. Increased density or thickness of pulmonary markings, or arborization, is much more often due to vascular engorgement or granulation tissue. Chronic interstitial pneumonias are often missed because positive shadows are lacking. A faint general opacity or granular appearance is characteristic but may be masked by translucency due to emphysema. Silicosis is too often diagnosed on entirely inadequate evidence. This should be emphasized because in compensation cases the admission of supposed medicolegal proof of fibrosis almost assures the success of a claim for disability when the occupation is suspected. To cast a positive shadow, fibrous tissue must contrast with surrounding lung tissue. Silicotic nodules should be visualized if of sufficient size, also the advanced diffuse or massive lesions which later develop. Caseation and fibrosis cannot always be sharply differentiated, although evidence of contraction points toward the latter. Hebert selected 30 films from different patients, 10 of whom had and 20 had not appreciable evidence of fibrosis determined by complete assessment of the case, and submitted them to a group of eminent clinical and X-ray specialists, 70 men in all, with request for opinions as to the existence of specified forms of fibrosis, with reasons or comments. In the case of 9 films there was good agreement, 83 per cent or more, in 21 films poor agreement, 69 per cent or less, with nearly as many incorrect as correct replies. Tabulated in a different way, fibrosis was diagnosed when present in 57 per cent, when absent in 35 per cent. Omitting 11 especially difficult films, the presence of fibrosis was diagnosed in 75 per cent, but it was also diagnosed in 30 per cent when not present as judged by complete evidence. This study led to the following conclusions: Contraction of the lung or a part of it is good evidence of fibrosis if collapse (atelectasis) can be ruled out. Neither a generalized nor localized interstitial fibrosis should be diagnosed from the presence of linear shadows unless these are well marked or conform to a recognized type. Especially should "increased arborization" lead to doubt, since it can be caused by congestion, bronchitis and bronchiolitis (Irvine, Miners' Phthisis Bureau, 1930). Slight or diffuse fibrosis is frequently missed. Conversely, shadows actually due to dense tuberculous infiltration (or necrosis) are often misinterpreted as due to fibrosis. Multiple nodular markings should be regarded as due to an inflammatory process unless sharply defined or of the characteristic silicotic type. The clinical history and symptoms must be considered. A generalized peribronchial fibrosis can rarely be distinguished with certainty from a chronic inflammatory process without fibrosis (by X-rays alone). Neither density nor thickness of the wall of a round cavity can in itself be regarded as evidence of fibrosis. Coarse linear bands, especially near an interlobar fissure, are more often due to exudate than fibrosis. The better the correlation with the history and clinical picture, the less frequently will mistakes be made.—*Fibrosis of the Lungs, G. T. Hebert, Tubercle, January, 1939, xx, 145.*—(*A. P.*)

Lung Abscess.—Various factors in the production of pulmonary abscess, gangrene and bronchiectasis are considered. In treatment it is suggested that patients who are scheduled for operation upon the nose or throat should have their gums cleared of any pyorrhoea alveolaris and tartar removed from the teeth. They should be kept in a position that is least likely to result in aspiration of blood into the lung, particularly if the cough and swallowing reflexes are paralyzed by the anaesthetic. Patients presenting a clinical picture of pneumonia should be studied, by sputum examinations and X-ray films, for the possibility of pulmonary abscess. With the earliest indications of a suppurative pneumonia the patient should be given some form of the arsphenamine group of drugs. Increasing the moisture of the air in the room or direct inhalation of gomenol tends to relieve bronchial obstruction. Too frequent use of gomenol usually leads to an acute chemical bronchitis and may result in serious haemorrhage from the lung. As healing progresses, phrenic crushing may be of assistance in hastening the process. When sputum is reduced to about 30 cc. per day, cough should be controlled to prevent haemorrhage and bronchiectasis. Artificial pneumothorax is contraindicated. When satisfactory drainage is not obtained, bronchoscopic drainage is recommended. The use of iodized oil in chronic basal sup-

purations is recommended. If the abscess walls are too thick to allow closure, the patient should be subjected to surgical care.—*The Mechanics of Pulmonary Abscess, Pulmonary Gangrene, and Bronchiectasis, with a Suggested Method of Treatment, M. Joannides, J. Thoracic Surg., April, 1939, viii, 427.*—(*L. F. B.*)

Abscess of Lower Lobes.—The predilection of putrid pulmonary abscess for the right lower lobe has been noted by many observers and the superior division of the lower lobe is referred to as the most common site. Among 69 cases of pulmonary abscess, 31 were upper and middle lobe lesions and 38 were lower lobe lesions. Of the 38 lower lobe abscesses, 18 were in the superior division and 20 were in the inferior division. Incidence of localization in the superior division is more striking when one considers that the inferior division constitutes the greater bulk of the lobe. Proper treatment depends upon the recognition of lesions in the superior division. An abscess in the superior division of the lower lobe may appear to be situated at or near the hilum and inaccessible for surgical drainage, or if the location of the abscess is mistakenly diagnosed, surgical drainage is likely to be delayed. The true situation of the lesion can usually be determined by certain distinctive physical, roentgen and bronchoscopic features. Abnormal physical signs were noted over the posterior aspect of the thorax in the area between the spine and the posterior axillary line, and between the levels of the fifth and ninth ribs. Impairment of percussion note was the most valuable physical sign. Bronchoscopic examination permits determination of the source of purulent secretion. The chief source of error by roentgen examination is found in improper interpretation of films. Frontal films often give a false impression. Lateral films often reveal the true location of the abscess but they may occasionally be confusing. Frequently the laminagraph has located hidden abscess cavities. Lipiodol bronchograms have often given additional information.—*The Clinical and Roentgenologic Features of Pulmonary Abscess Located in the Superior Division of the Lower Lobes, D. W. Myers & B. Blades, J. Thoracic Surg., February, 1939, viii, 321.*—(*L. F. B.*)

Lung Abscess.—The therapeutic results in three patients with lung abscess are presented. Clinical and roentgen improvement was obtained in one case by daily intravenous injection of 20 to 50 cc. of a 10 per cent sodium benzoate solution. In the second case with an abscess of the right lower lobe, lobectomy resulted in a complete cure. A less definitive result was obtained in the third case in which pleural adhesions and the patient's poor general condition made lobectomy impossible and a three-stage thoracoplasty was performed, with the expectation that subsequent pleural retraction would collapse the suppurating cavities.—*Trois observations d'abcès pulmonaires, R. Desmeules, Laval Méd., January, 1939, iv, 6.*—(*A. B. C.*)

Radiotherapy in Lung Gangrene.—The patient reported was a fifty year old man who had received radium treatment for cancer of the tongue four months before the present illness. He was readmitted with a two weeks' story of fever, cough and foetid sputum. There was extensive infiltration in the right midlung field. On the assumption that this lesion was necrotic cancer, the patient was given intensive radiotherapy. Within one week there was marked improvement, and after six weeks the patient was symptom free and the chest X-ray film essentially negative. The patient was well six months later. Apparently this patient had been suffering from an inflammatory rather than a neoplastic lesion. Although the authors recognize the fact that localized gangrenous lesions of the lung may subside spontaneously, they are convinced the radiotherapy was of definite value in this case.—*Un cas de gangrène pulmonaire circonscrite traitée par radiothérapie, P. Uhry, H. Bour & J. Loeper, Progrès méd., July 8, 1939, no. 27, 976.*—(*H. R. N.*)

Short Wave Treatment of Lung Abscesses.—Of 27 cases of pulmonary abscesses 19 were cured, 6 improved and 2 died. The number of treatments varied from 25 to 96. Large electrodes of glass or rubber with a distance of at least 4 cm. between electrode and skin should be used. Daily treatments of five to twenty minutes were given over a long period of time, the duration of which depended upon roentgenological finding of complete absorption of abscess and pneumonitis. The author feels that short wave therapy of pulmonary abscesses is superior to any other treatment, but he excepts bronchiectatic abscesses which became definitely worse. Size and location of the lesion play no important part as regards the treatment. Multiple abscesses react as well as bilateral lesions, and transformation of an abscess into gangrene is not a contraindication for this therapy. Short waves should be applied as early as possible in order to prevent adverse complications and demarcation of the abscess should not be waited for. Surrounding pneumonitis disappears soon after the beginning of the

treatment and healing usually occurs by absorption. Toxic effects need not to be feared. Poor general condition of the patient with pyrexia and circulatory disturbances represents a rather urgent indication for the application of short waves. Simultaneous pleural empyema renders short wave therapy definitely more difficult; however, the treatment should be continued after drainage of the fluid over a long period of time, in order to prevent or to improve pleural thickening. Short wave therapy should also be applied in cases where surgery was applied. The method offers a material shortening of the duration of the disease and good final results. Treatment should only be given under special medical supervision and with sufficiently powerful short wave machines and should be continued for a long time under regular radiological observation. —*Die Kurzwellenbehandlung des Lungenabszesses, W. Dieker, Fortschr. a. d. Geb. d. Röntgenstrahlen, March, 1939, lix, 139.*—(*F. G. K.*)

Treatment of Lung Abscess.—The authors have made an exhaustive study of the literature covering short wave diathermy in the treatment of lung abscess and discuss such treatment in 129 collected cases, of which 87, or 67 per cent, were reported cured. They present also clinical summaries of 8 of their own cases with end results. The patients with two exceptions were hospitalized during the course of therapy. Treatments were usually given daily, beginning with an initial one of ten minutes' duration. The duration was gradually increased to thirty or even forty-five minutes. Large glass electrodes 20 cm. in diameter were used. They were usually placed from 4 to 6 cm. from the skin. The wave lengths selected were 4 cm. or 6 cm. A large two-vacuum tube machine was used. It has an output of 500 watts when generating a 6 meter length. During the first treatments increased expectoration was often noticed. The results in these 8 cases indicated that short wave therapy is of far less value for lung abscess than the advocates of this method claim. The authors are especially doubtful of the possibility of curing chronic abscesses with short waves. There is some danger that patients may be lost by persistence in conservative treatment who might be saved by surgical intervention. Of the 8 cases reported, 7 failed to respond to short wave therapy, and one case, while marked improvement occurred at first, failed to close a small cavity, a later return of symptoms necessitating surgery. Six cases were eventually treated surgically, of which 3 died and 3 made a satisfactory recovery.—*Short Wave Diathermy in the Treatment of Lung Abscess, H. G. Brugsch & J. H. Pratt, J. A. M. A., May 27, 1939, cxii, 2114.*—(*G. L. L.*)

Aetiology of Bronchiectasis.—The present experimental studies were designed to study the effects of infection of bronchial wall and peribronchial tissues; bronchial obstruction of various kinds and degrees; and the effect of various forces on the bronchial walls. Partial or complete bronchial obstruction was produced by Adams' technique of painting the bronchial mucosa with a 35 per cent silver nitrate solution applied through a bronchoscope, the time required being ten days to two weeks. To produce infection, organisms from a patient with chronic lung abscess were used, the lung being inoculated by injecting a saline suspension of organisms through a narrow gauge tube introduced bronchoscopically. In another group the organisms were suspended in iodized oil and sprayed through a bronchoscope with an atomizer into the air passages. Increased negative pressure exerted from outside the bronchi was obtained by producing massive atelectasis of one or more lobes of the opposite lung, induced by complete occlusion of the corresponding primary bronchus. Three separate experiments were carried out, using 8, 7 and 11 dogs respectively. Bronchiectasis was produced experimentally in dogs. Two necessary factors were: incomplete bronchial obstruction and contamination (infection) of the bronchial tree: both aerobic and anaerobic pyogenic organisms, the tubercle bacillus and distemper organisms, were potential contributory agents. The bronchiectasis developed to a somewhat more marked degree in the presence of increased negative intrapleural pressure. Laennec's original theory (mechanical pressure of stagnant secretions with attendant inflammatory weakening of bronchial walls) thus appears to be fortified experimentally.—*The Aetiology of Bronchiectasis, W. E. Adams & L. Escudero, Tubercle, May, 1938, xix, 351.*—(*A. P.*)

Lobectomy for Bronchiectasis.—In cases with bronchiectasis, the entire bronchial tree on each side should be outlined by radiopaque iodized oil and studied to determine the exact extent of disease. Patients with a certain degree of emphysema represent poor risks, although in some costal motion may be improved by careful training in breathing exercises. Bronchoscopy is performed only if there is evidence of bronchial obstruction. Since chronic paranasal sinus disease and chronic tonsillar

infection are frequently associated with bronchiectasis, appropriate treatment is given as indicated. A small preoperative artificial pneumothorax facilitates entry into the pleural space. Positive pressure anaesthesia is unnecessary. Intratracheal administration is not absolutely necessary but desirable since intermittent suction through a catheter can be applied. Transillumination of adhesions enables the surgeon to avoid cutting lung or diaphragm. The pulmonary ligament usually contains at least one fair sized blood vessel which must be ligated. When the lobe is amputated it is important to seal off the pleural cavity by large packings. When the patient is a child the amputation should be at a slightly greater distance from the tourniquet since the pedicle tissues retract to a greater degree than in an adult. Damage to the pericardium must be carefully avoided, but pericarditis has occurred without visible injury to the pericardium. Bronchoscopy is performed routinely after lobectomy. Aspiration of air from the pleural cavity to expand the lung and increasing the pressure in the anaesthetic system are not necessary. A small bronchial fistula occurs in about 60 per cent of the cases. Any empyema should be aspirated. Secondary haemorrhage in the chest wall may occur. A phrenicectomy is usually performed three to six months after operation. The most common cause of death is infection in the remaining lung of the same or other side. Secondary haemorrhage, brain abscess and suppurative pericarditis have accounted for several deaths. Pulmonary oedema has occurred a number of times.—*Practical Points in Lobectomy, I. A. Sarot, J. Thoracic Surg., February, 1939, viii, 300.*—(*L. F. B.*)

Lobectomy for Bronchiectasis.—In a series of 10 cases, a single stage pneumonectomy was done in 1, complete pneumonectomies in 2, the upper lobe being removed at later operation. The right middle and lower lobes were removed in 1 case. Lobectomy was done in 7 cases. When the entire pathological tissue had been removed, cure resulted. Where the lower lobe has been removed in patients with only slight involvement of the upper lobe, the disease has progressed requiring an upper lobectomy. When unilateral diseased lungs were removed there was no spread of disease to the contralateral lung. Pneumonectomy in stages where indicated is feasible. Postural deformities have not occurred. Phrenic resection or crushing has not been necessary to obliterate the space and thoracoplasty has not been necessary. Elevation of the diaphragm and mediastinal shift has caused no visceral or circulatory disturbance and clinically there has been no disturbance in the pulmonary interchange of gases. Electrocardiogram is essentially normal in these patients. Histologically, emphysematous dilatation of the remaining lung was found in the one autopsied case. Physical development has been normal. The normal angle between the stem bronchus and trachea is increased on the uninvolved side and decreased on the operated side. Medically treated patients do surprisingly well, but endless, intelligent, methodical attention is necessary. Mortality in unoperated cases is not great, at least up to twenty years of age. Recurrent pneumonitis and metastatic brain abscess account for most deaths. Moderate or advanced bronchiectasis is not incompatible with fair longevity.—*Late Results of Lobectomy for Bronchiectasis in Children, J. V. Bohrer & C. W. Lester, J. Thoracic Surg., April, 1939, viii, 412.*—(*L. F. B.*)

Fibrinous Bronchitis.—Both therapy and pathogenesis in this condition are still far from clear. Weber has pointed out the close relationship of fibrinous bronchitis to bronchial asthma and strongly considered the possibility of an allergic basis in the former condition. He also observed fibrinous bronchitis in a case of Basedow's disease, in which the severity of the bronchial symptoms closely paralleled the severity of the thyroid disease. Consequently Weber felt that a disturbance of the vegetative nervous system, particularly the parasympathetic, plays a rôle in the pathogenesis of fibrinous bronchitis. The author observed a patient with bronchitis fibrinosa. The clinical picture was characterized by recurrent episodes of severe cough and dyspnoea, relieved by the expectoration of bronchial casts. During a symptom-free period, all the symptoms including, apparently, the formation of new bronchial casts could be induced by the subcutaneous injection of histamine. Her symptoms were rapidly relieved on several occasions by the intramuscular injection of Torantil the action of which is antagonistic to that of histamine. Although there were no symptoms of hyperthyroidism the basal metabolic rate, during a symptom-free period, was found to be +50 per cent. There would appear to be no doubt that the release of histamine within the body plays an essential rôle in the production of the bronchial casts seen in this disease. The importance of histamine in the production of anaphylactic phenomena is well known. It has also been shown that anaphylaxis can occur primarily as a local phenomenon. The striking effect of Toran-

til also confirms these conclusions regarding the rôle of histamine in this disease. Torantil is a ferment, found in the mucosa of the small intestine, which destroys histamine and histamine-like substances. It is probable that in the untreated case Torantil or a similar substance is released by the body, resulting in a spontaneous subsidence of the severe symptoms. Skin tests in this case gave uniformly negative results. It is possible but as yet purely hypothetical that a hyperthyroid constitution may provide the basic substratum for true bronchitis fibrinosa. Chemical examination of the bronchial casts revealed the protein portion to be composed of fibrin with small amounts of albumin and globulin.—*Zur Pathogenese und Behandlung der Bronchitis fibrinosa, O. Roth, Klin. Wchnschr., December 17, 1938, xvii, 1798.*—(*H. R. N.*)

Streptothricosis of Lung.—A case of pseudotuberculosis produced by *Streptothrix alba* is presented. Recurrent haemoptyses, nonfoetid sputum, extension of the disease to the pleura with the development of an empyema and a fatal outcome are the clinical features of the case. X-ray films showed a bronchopneumonic process involving the right upper lobe with an old calcified lesion in the fifth right anterior interspace. Since no postmortem was obtained the relation of these lesions remained undetermined. Although streptothrix is known to be a secondary invader in tuberculous cavities and is considered by some observers to be a mutation form of the tubercle bacillus, at no time were organisms other than streptothrix obtained on cultural examination and animal inoculation of the sputum and pleural fluid.—*Fall einer durch einen Fadenpilz hervorgerufenen Pseudotuberkulose der Lunge, C. Fossati, Ztschr. f. Tuberk., January, 1939, lxxxi, 317.*—(*A. B. C.*)

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